SYLVANIA

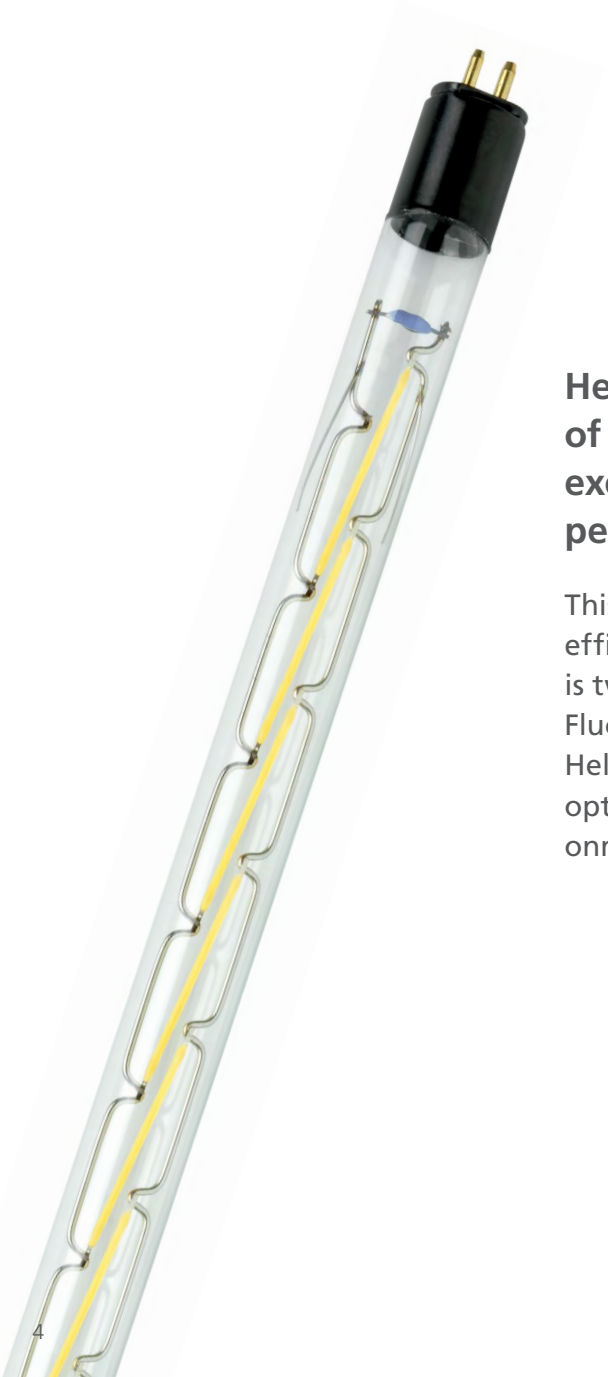
Helios

An entirely new gas-cooled linear LED light source

Light your world

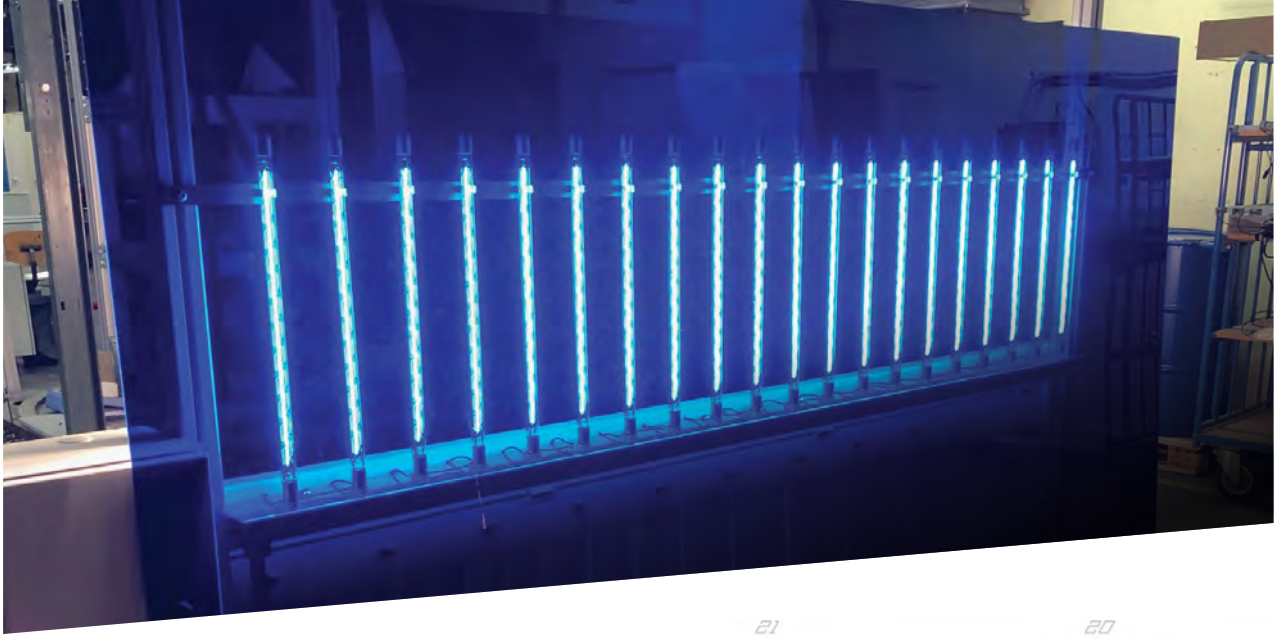
Contents

Helios



Helios is an entirely new class of linear LED light source with exceptionally high system performance.

This includes an outstanding operating efficacy of up to 200 lumens per watt, which is twice the efficacy of the best-in class Fluorescent T5 systems. The unique design of Helios allows full 360° radiation and excellent optical control due to its very slim onmidirectional light source.



Traditional PCB-mounted LED emitters have been used in professional lighting applications for many years, however they have certain limitations.

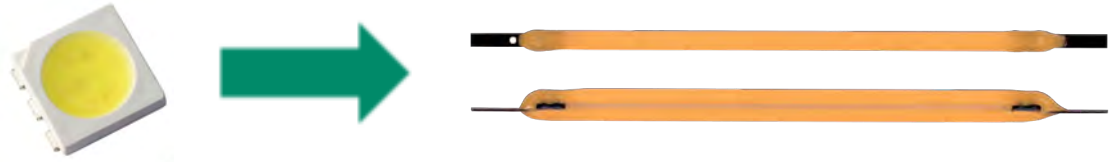
Sylvania is a pioneer in gas-cooled LED filament technology, having made a series of major technical breakthroughs, so that filaments can now be used as part of high-power professional lighting systems. We are proud to have been awarded three patents for our inventiveness in this area of lighting.

- Uniform gas distribution along lamp length to ensure stable convective cooling
- Elimination of current variation between multiple parallel-connected filaments
- Sophisticated and stable mechanical construction
- Development of advanced and highly automated new LED production processes.

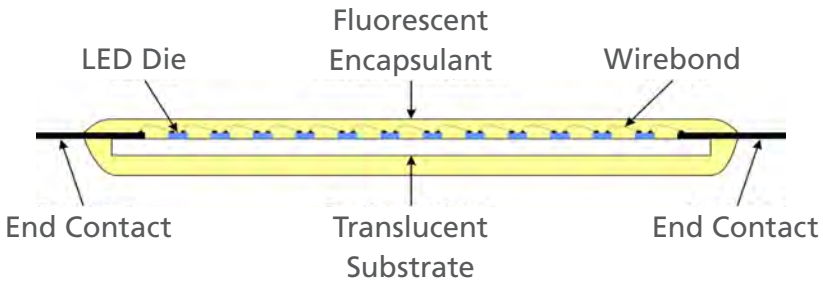
Sylvania Helios filament lamps have addressed all these challenges.

What is Helios?

Sylvania has fundamentally changed the construction of a linear lamp with the development of Helios. This has seen a shift from surface-mounted LED emitters to gas-cooled LED filaments.



The key reason for such a change is that LED filaments allow Helios to offer a full 360 degree light emission – a world first for a linear LED product. Filaments can achieve higher efficacy than traditional surface-mounted LEDs (200 lm/W). They also facilitate the achievement of an improved uniformity of tube surface luminance without hot spots.



Microscope photograph
of an individual LED filament

The Helios lamp construction consists of LEDs sealed into a vacuum-tight glass tube, instead of inferior open-to-air solutions. This unique approach keeps out moisture, sulphur and other chemicals that attack LEDs, enabling Helios to maintain better lumen output and superior colour stability throughout its long life.

The hermetically sealed envelope exceeds IP68 ratings for moisture and dirt ingress.

Furthermore, the glass barrier prevents the escape of silicone vapours from within the LEDs, which can disrupt industrial processes such as painting.

LED Filament mount assembly is hermetically sealed into a T5 glass tube

The glass tube is filled with a mixture of heat-conductive gases that provide cooling, while avoiding light-blocking metal heat sinks that are found in many LED lamps.
By optimally managing the thermal properties of the Helios lamp, higher lumen packages are possible.

Helios lamps also have the benefit of being able to withstand higher ambient temperatures than many traditional LED solutions.

Standard LED emitter

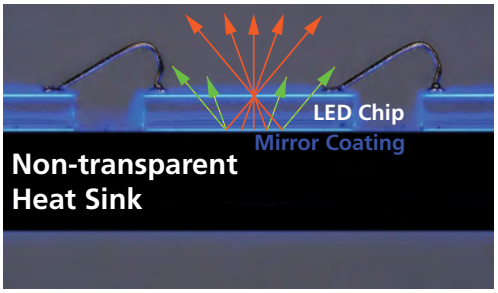


Diagram 1

Direct Rays

Reflected Rays

Filament LED emitter

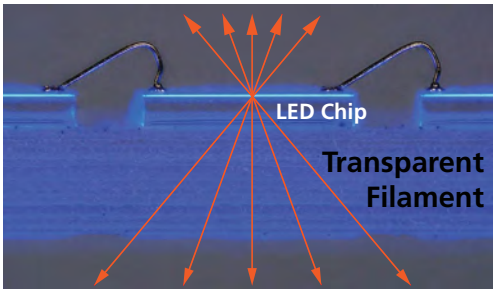
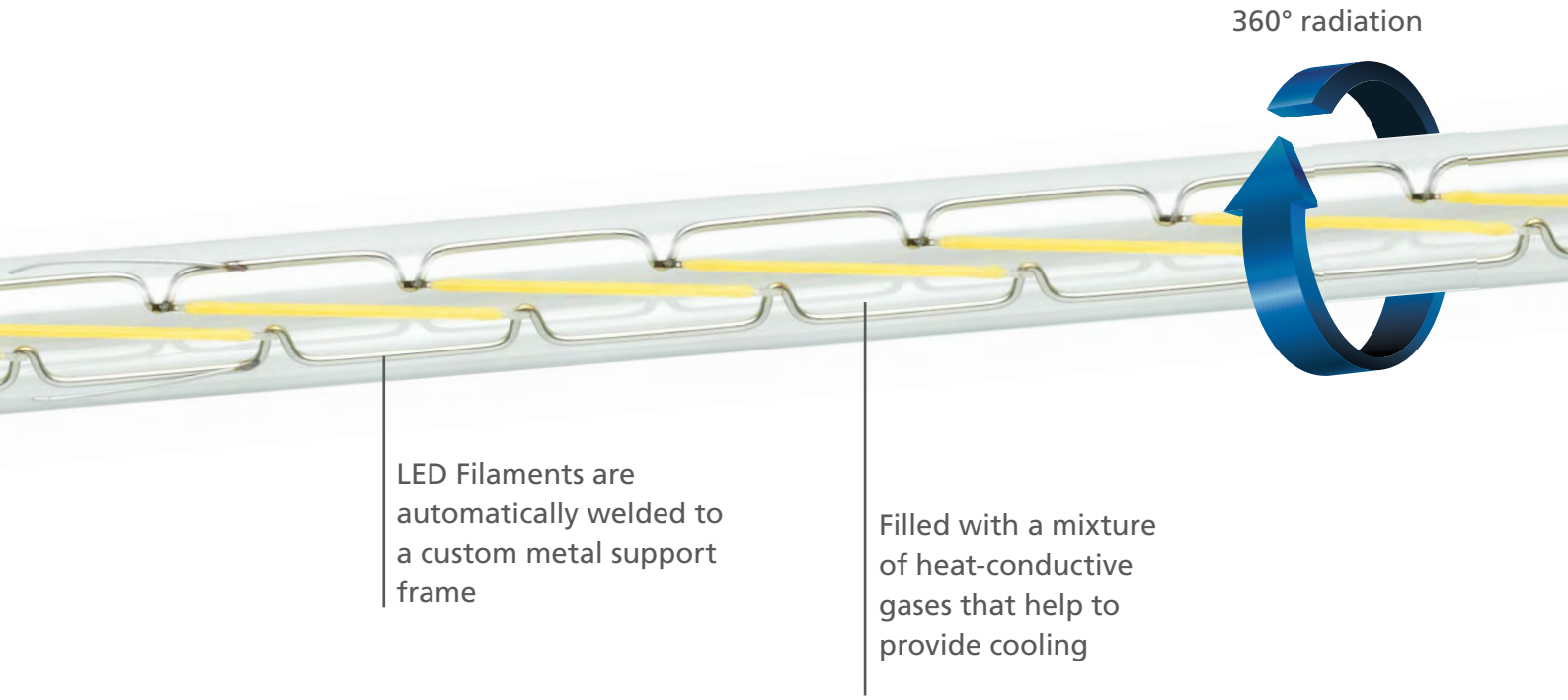


Diagram 2

As seen in diagram 1 above, traditionally, LED chips are mounted on a back mirror coating which does not reflect 100% of the light. However Helios uses gas-cooled LED filaments in transparent heatsinks (gases) which allows all the light to escape – 360 degree radiation (Diagram 2).

Benefits of Helios

- Outstanding operating efficacy up to 200lm/W
- Omnidirectional 360° radiation
- More uniform surface luminance
- Consistent lumen output and colour temperature
- Hermetically closed glass tubes
- No escape of silicone vapour from LED's which can disrupt industrial processes
- Increased lumen packages are available
- Similar or better lifetime to standard LED lamps
- Remote driver allows full dimming and controllability, including use in emergency lighting systems
- No entry of sulphur or other LED damaging gases
- Can tolerate high ambient temperatures >50 degrees Celsius
- High degree of flexibility: special spectra, tunable white and high CRI options



LED Filament mount assembly is hermetically sealed into a T5 glass tube

- No escape of silicone vapour
- Better lumen output
- Consistent colour temperature

No light blocking metal heat sinks

Helios compatibility

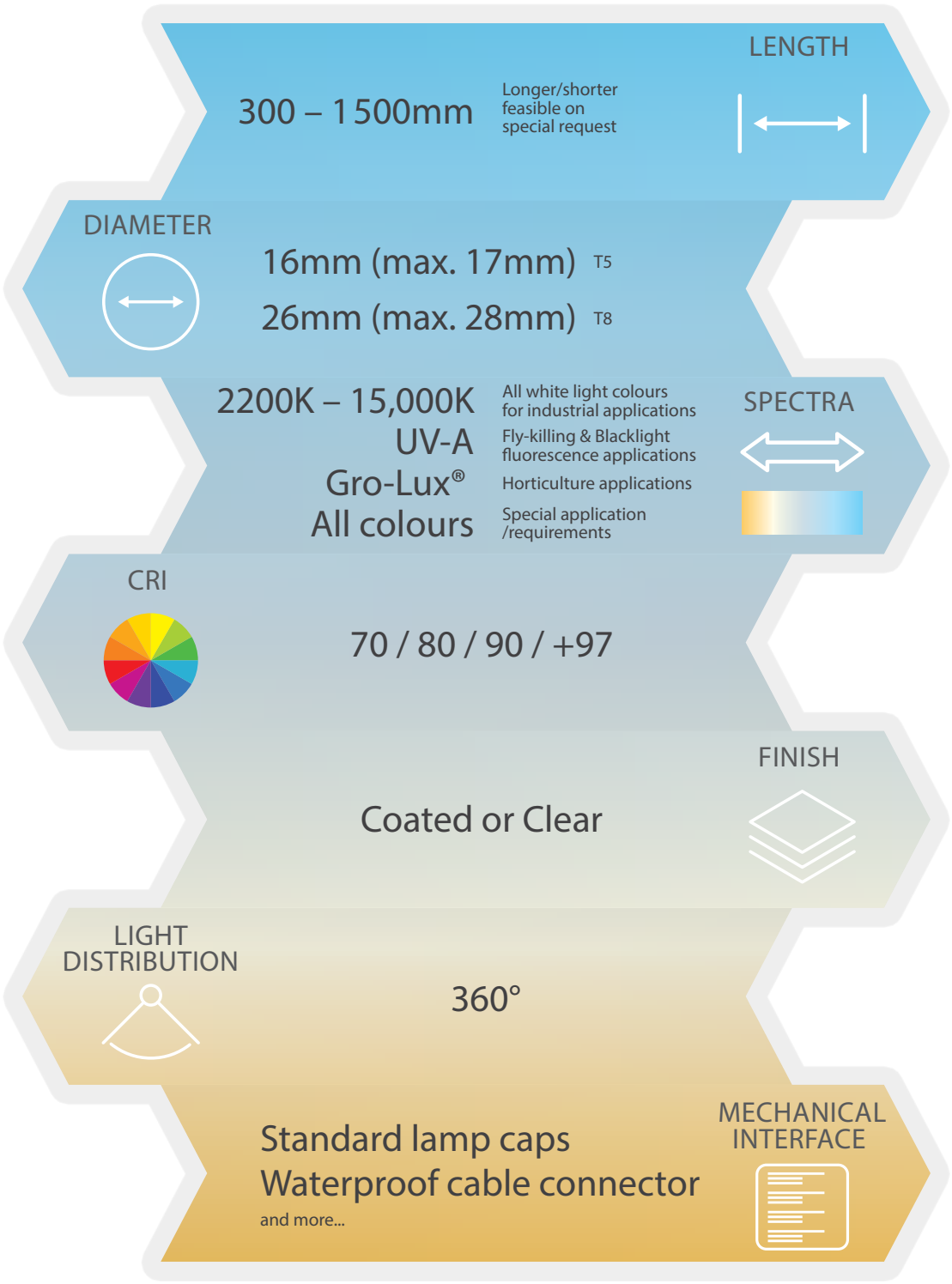
Helios lamps are a non-retrofit concept. They are intended for modified fluorescent or completely new luminaires.

Mechanical - Identical dimensions and caps as linear fluorescent lamps – however in common with other LED tubes, the power is supplied from only one end.

Electrical - No internal driver. Helios uses standard external LED drivers for maximum reliability and control.

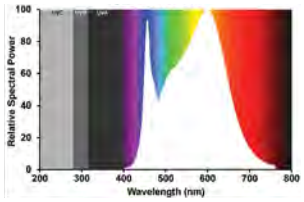
Lifetime - Similar or better than other LED lamps, double the lifetime of a fluorescent tube.

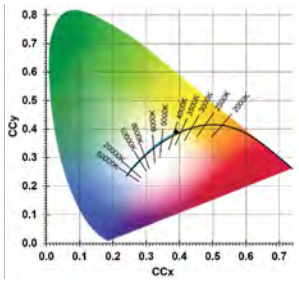
Available Helios Lamp Options

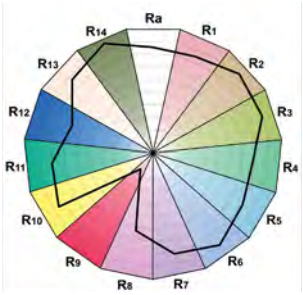


Available Spectra

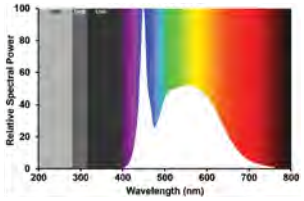
LED Helios 840

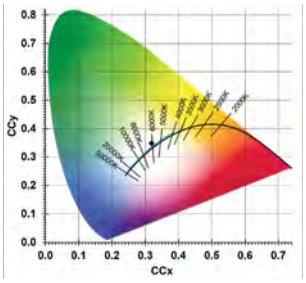


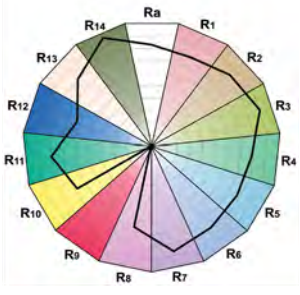




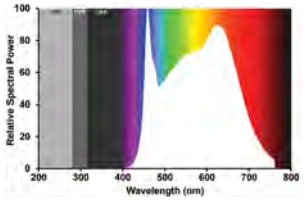
LED Helios 860

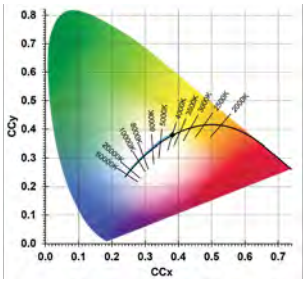


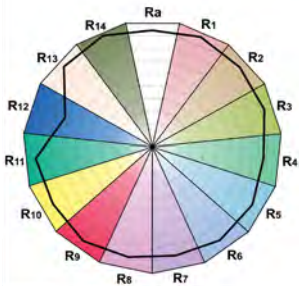




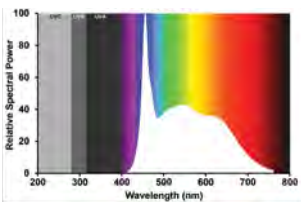
LED Helios 940

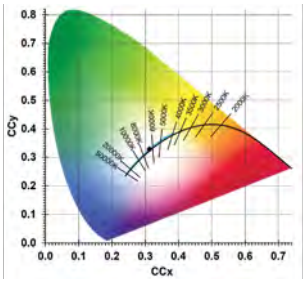


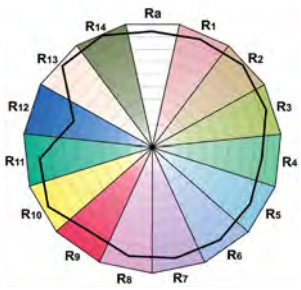




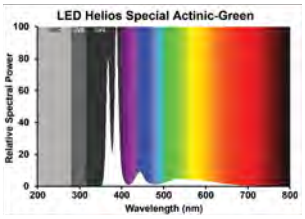
LED Helios 965

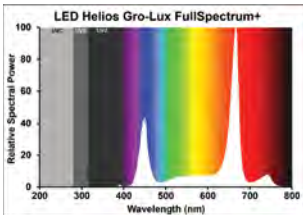


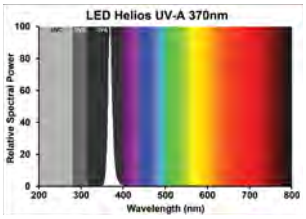


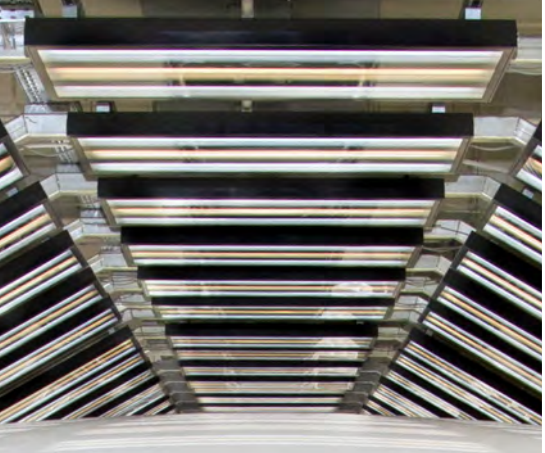


Examples of other spectra developed on special request









Application possibilities

Helios is a versatile and high-performing product that can be developed for use in a multitude of different applications. For example:

Industrial Illumination:

- Automotive & aircraft painting areas
- Silicone-free industrial environments
- High ambient temperature environments
- Ammonia-resistant Pig & Poultry farming

Horticulture:

- Vertical farming
- Toplighting
- Potato sprouting & storage
- Microalgae cultivation

Photo-Optic:

- Paint & surface quality inspection
- Colour comparison booths
- Photographic lighting

Ultraviolet:

- Insect attraction & fly-killing
- Crack detection & non-destructive inspection

The next few pages focus in further detail on some of these applications to demonstrate the flexibility of Helios.

Please contact Sylvania to discuss how Helios can be developed to meet your specific needs.

Automotive Paint Inspection

A perfectly painted surface is every car's staple feature and therefore represents an important measure of quality for the customer. However, all LEDs contain silicones which can interfere with the paint process.

Why Helios?

- Sealed construction eliminates silicone vapour emission from LEDs and enables use in paint chambers
- Special version with satin coating: identical light distribution as linear fluorescent T8
- No hot-spots when compared to traditional LED tubes
- 360° light emission essential to function with fixture optics, CRI up to R_a97
- Greater energy saving and longer life versus ordinary LED Retrofit T8 tubes, reduced carbon footprint
- External driver allows full control and dimming to match the paint colour being inspected
- Circular Economy: Luminaires fitted with Helios lamps enable modular, repairable lighting components, reducing electronic waste

Aircraft Surface Inspection

Why Helios?

- Inspection requires a special colour point with CRI 95+ combined with high efficacy > 160lm/W
- Modular concept required with replaceable LEDs: not cost-effective to maintain and replace fixtures every 3 to 5 years
- Requirement for stability at high ambient temperatures >50°C, not possible for majority of LEDs
- Full system solution is possible comprising special variant of Sylvania Rana T5 luminaires

Aircraft should be kept thoroughly clean of deposits containing substances such as oil, grease, dirt and other organic or foreign materials to prevent the aircraft from the potential risk of corrosion, degradation of seals, and plastic components.

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Industrial & Farming

Light is often required in aggressive environments that present severe challenges for traditional LEDs. For instance, high ammonia levels in animal farming corrode LED components and shorten life. High temperatures in industrial applications also reduce LED lifetime.

Why Helios?

- Outstanding gas-cooling keeps LEDs cool even at extreme ambient temperatures
- Hermetically sealed glass construction protects inner LEDs from humidity and corrosive vapours
- Superior lumen maintenance and colour stability due to chemically neutral internal environment
- Optimised spectra available to match specific animal responses, e.g. reduced red to lower aggression in poultry farms
- Simple lamp replacement at end of life, in line with Single Lighting Regulation Circular Economy objectives

Horticulture

The demand for horticulture products has never been higher with growing populations, rising food prices and the desire for fresh, organic, all-year-round crops.

Helios has many USP's for Horticulture

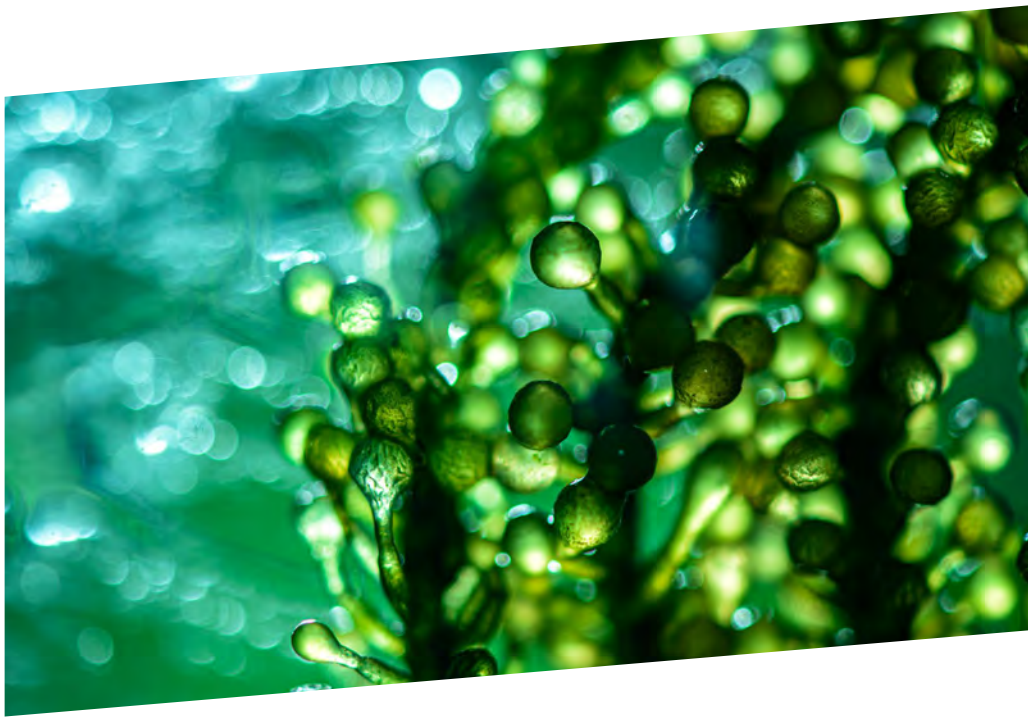
- Very high efficacy = lowest heat generation
- Totally sealed waterproof construction > IP68
- 360 degree light distribution = uniform plant growth across large areas
- More cost efficient to produce than conventional watertight LED modules
- Special Gro-Lux® spectrum or even colour tunable red:blue ratio possible
- Helios operates cooler than traditional LED and other lighting solutions, thereby minimising impact on air conditioning loads for cold storage areas
- Helios allows for vertical hanging lighting
- The lamps can be positioned closer to the foliage of plants and vegetables than other older and hotter grow-lights, as the low surface temperature ensures leaves cannot be scorched

Potato Chitting (Sprouting) Store

A key advantage of Helios is also to produce stronger sprouts that are better attached to the potato surface. Thereby reducing any damage during mechanised handling, and producing more consistent crop yields.

Microalgae Cultivation

Photobioreactors are used for the large-scale production of microalgae for use by the food, pharmaceutical, cosmetic and nutraceutical industries. These provide a controlled environment for growth and utilise light sources to assist with photosynthesis.



Vertical Farming

Commercial propagation requires specialised lights that have been designed to provide seedlings, cuttings and young plants with the right spectrum of light they need to grow.

Photography

Lighting is a key factor in creating a successful image. It is necessary to control and manipulate light correctly since lighting determines not only brightness and darkness, but also tone, mood and the atmosphere.

Why Helios?

- Requires very high CRI 95+ with different CCT 3200K, 5600K, 6500K
- Colour tunable option enables the lamp to be used both inside, where a lower Kelvin is needed (3200K), and outside, where a higher Kelvin is preferable (6500K)
- Can be used as a short flash to light subjects
- Could be used in photo booths:
  - 360 degree light distribution of Helios ensures no change in existing fixture optics
  - Helios has a modular concept, simple & fast lamp maintenance similar to the currently used LFL
  - Greater energy savings than traditional options and other LED solutions

Ultraviolet

Fly-killing

Airborne insects can each carry up to 4 million bacteria, viruses and parasites, causing a potential for contamination in areas where high levels of hygiene are needed. UV-A lamps attract these insects so they can be destroyed or decontaminated in a humane fashion.

Why Helios?

- UV LED lifetime is improved when excluded from air
- Gas filling conducts heat to lamp surface: heat also attracts flies
- Full glass construction easy to clean from insect vomit & excretions
- Currently using UV fluorescent, which has an uncertain future due to future fluorescent ban

Forensic UV Inspection

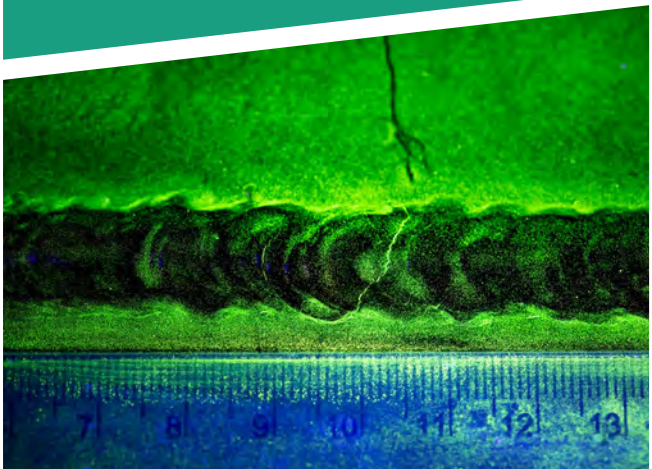
The fields of Transportation, Security and Crime all use UV Blacklight for close inspection of materials including aeroplane wings, train brakes, bank notes, passports and crime scenes.

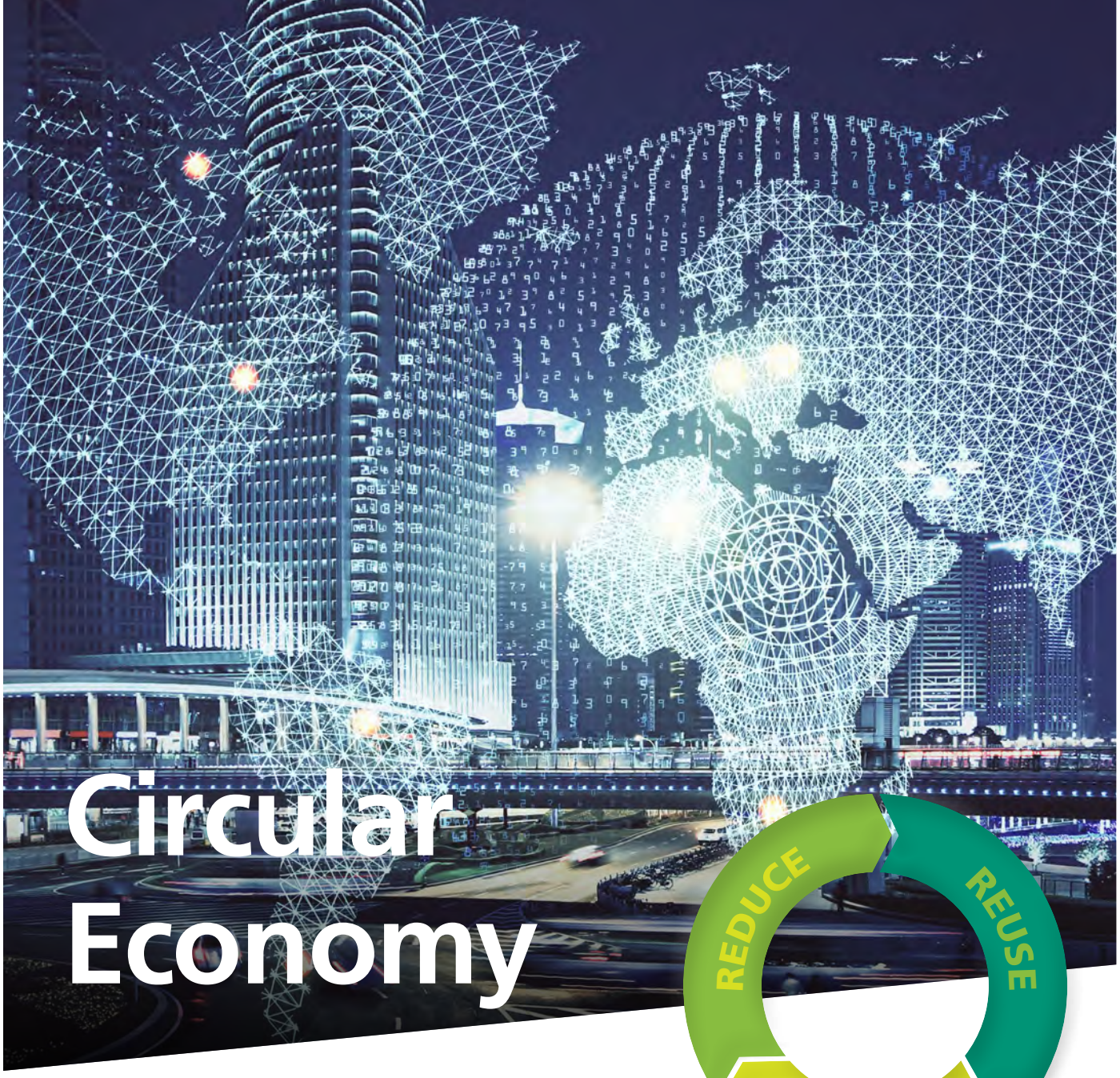
Why Helios?

- Currently using UV Blacklight fluorescent, which has an uncertain future due to future fluorescent ban
- Conventional LEDs attacked by chemical vapours from crack penetrating liquid resulting in early failures
- Helios is fully sealed against water / volatile organic vapours
- Helios solution can offer significant cost down for UV inspection versus current UV LED fixtures available on market

UV crack inspection of Aircraft parts

It is important in aircraft maintenance for defects to be found in a non-destructive and rapid way. Fluorescent liquids are sprayed onto the parts and UV light finds the glowing flaws and hairline fractures in non-porous solid materials.





Our new Helios range is a perfect fit with the EU Single Lighting Regulation (15th December 2019). This legislates for lighting manufacturers to be responsible for developing upgradeable luminaires. Sealed-for-life LED luminaire designs are now to be discouraged; the LED light engine and the driver must be replaceable. This has fixture design implications for the lighting industry as a whole.

Luminaires equipped with Sylvania's Helios technology offer easy upgradability and lamp replacement even after the warranty period. Thanks to the internationally standardised (G5 and G13) caps, re-lamping is simple and hassle-free. No need for any tools or the complexities of repairing integrated LED luminaires. Helios is a low-risk, affordable solution that future-proofs for the flexibility and repairability required by the new European regulations.

Current Range

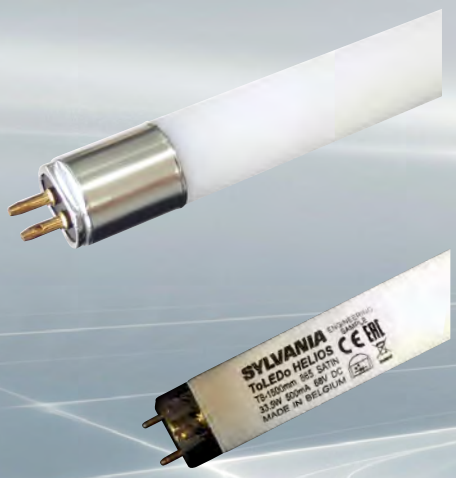
Please contact Sylvania for other variants.

Code	Description	Bulb	Finish	Cap	Diameter (mm)	Length (mm)	Power (W)	Voltage (V)	Current (mA)	Luminous Flux (ℓm)	Efficacy (ℓm/W)	CCT (K)	Colour Rendering (Ra)	Red Rendering (R_9)
Helios														
T5 – 549mm														
0085210	LED Helios T5-549mm 827 360° Clear	T5	Clear	G5	16	549	9.9	66	150	1625	164	2700	80	5
0085213	LED Helios T5-549mm 840 360° Clear	T5	Clear	G5	16	549	9.9	66	150	1800	182	4000	85	15
0085214	LED Helios T5-549mm 860 360° Clear	T5	Clear	G5	16	549	9.9	66	150	1925	194	6000	85	0
0085222	LED Helios T5-549mm 935 360° Clear	T5	Clear	G5	16	549	9.9	66	150	1550	157	3500	95	85
0085223	LED Helios T5-549mm 940 360° Clear	T5	Clear	G5	16	549	9.9	66	150	1575	159	4000	95	95
0085224	LED Helios T5-549mm 965 360° Clear	T5	Clear	G5	16	549	9.9	66	150	1650	167	6500	95	85
T5 – 849mm														
0085310	LED Helios T5-849mm 827 360° Clear	T5	Clear	G5	16	849	19.8	66	300	3375	170	2700	80	5
0085313	LED Helios T5-849mm 840 360° Clear	T5	Clear	G5	16	849	19.8	66	300	3750	189	4000	85	15
0085314	LED Helios T5-849mm 860 360° Clear	T5	Clear	G5	16	849	19.8	66	300	3875	196	6000	85	0
0085322	LED Helios T5-849mm 935 360° Clear	T5	Clear	G5	16	849	19.8	66	300	2750	139	3500	95	85
0085323	LED Helios T5-849mm 940 360° Clear	T5	Clear	G5	16	849	19.8	66	300	3000	152	4000	95	95
0085324	LED Helios T5-849mm 965 360° Clear	T5	Clear	G5	16	849	19.8	66	300	3000	152	6500	95	85
T5 – 1149mm														
0085410	LED Helios T5-1149mm 827 360° Clear	T5	Clear	G5	16	1149	26.0	65	400	4500	173	2700	80	5
0085413	LED Helios T5-1149mm 840 360° Clear	T5	Clear	G5	16	1149	26.0	65	400	5050	194	4000	85	15
0085414	LED Helios T5-1149mm 860 360° Clear	T5	Clear	G5	16	1149	26.0	65	400	5200	200	6000	85	0
0085422	LED Helios T5-1149mm 935 360° Clear	T5	Clear	G5	16	1149	26.0	65	400	4000	154	3500	95	85
0085423	LED Helios T5-1149mm 940 360° Clear	T5	Clear	G5	16	1149	26.0	65	400	4200	162	4000	95	95
0085424	LED Helios T5-1149mm 965 360° Clear	T5	Clear	G5	16	1149	26.0	65	400	4200	162	6500	95	85
T5 – 1449mm														
0085510	LED Helios T5-1449mm 827 360° Clear	T5	Clear	G5	16	1449	32.5	65	500	5600	172	2700	80	5
0085513	LED Helios T5-1449mm 840 360° Clear	T5	Clear	G5	16	1449	32.5	65	500	6200	191	4000	85	15
0085514	LED Helios T5-1449mm 860 360° Clear	T5	Clear	G5	16	1449	32.5	65	500	6500	200	6000	85	0
0085522	LED Helios T5-1449mm 935 360° Clear	T5	Clear	G5	16	1449	32.5	65	500	4750	146	3500	95	85
0085523	LED Helios T5-1449mm 940 360° Clear	T5	Clear	G5	16	1449	32.5	65	500	5200	160	4000	95	95
0085524	LED Helios T5-1449mm 965 360° Clear	T5	Clear	G5	16	1449	32.5	65	500	5200	160	6500	95	85
T8 – 600mm														
0086000	LED Helios T8-600mm Dim 827 360° Satin	T8	Satin	G13	26	600	9.9	66	150	1500	152	2700	80	10
0086002	LED Helios T8-600mm Dim 840 360° Satin	T8	Satin	G13	26	600	9.9	66	150	1600	162	4000	80	20
0086004	LED Helios T8-600mm Dim 860 360° Satin	T8	Satin	G13	26	600	9.9	66	150	1675	169	6000	80	0
0086102	LED Helios T8-600mm Dim 940 360° Satin	T8	Satin	G13	26	600	9.9	66	150	1200	121	4000	95	85
0086104	LED Helios T8-600mm Dim 960 360° Satin	T8	Satin	G13	26	600	9.9	66	150	1275	129	6000	95	80
T8 – 1200mm														
0086010	LED Helios T8-1200mm Dim 827 360° Satin	T8	Satin	G13	26	1200	23.8	66	360	3400	143	2700	80	10
0086012	LED Helios T8-1200mm Dim 840 360° Satin	T8	Satin	G13	26	1200	23.8	66	360	3600	152	4000	80	20
0086014	LED Helios T8-1200mm Dim 860 360° Satin	T8	Satin	G13	26	1200	23.8	66	360	3800	160	6000	80	0
0086112	LED Helios T8-1200mm Dim 940 360° Satin	T8	Satin	G13	26	1200	23.8	66	360	2700	114	4000	95	85
0086114	LED Helios T8-1200mm Dim 960 360° Satin	T8	Satin	G13	26	1200	23.8	66	360	2850	120	6000	95	80
T8 – 1500mm														
0086020	LED Helios T8-1500mm Dim 827 360° Satin	T8	Satin	G13	26	1500	31.7	66	480	4530	143	2700	80	10
0086022	LED Helios T8-1500mm Dim 840 360° Satin	T8	Satin	G13	26	1500	31.7	66	480	4800	152	4000	80	20
0086024	LED Helios T8-1500mm Dim 860 360° Satin	T8	Satin	G13	26	1500	31.7	66	480	5200	164	6000	80	0
0086122	LED Helios T8-1500mm Dim 940 360° Satin	T8	Satin	G13	26	1500	31.7	66	480	3600	114	4000	95	85
0086124	LED Helios T8-1500mm Dim 960 360° Satin	T8	Satin	G13	26	1500	31.7	66	480	3850	122	6000	90	80

Helios System Information

Helios Lamp Formats

Helios lamps have been developed in a number of different formats. The standard range is made in a T5 (16mm diameter) clear glass tube with the same end caps and dimensions as T5 fluorescent lamps. Other lengths are available upon request. A standard DC LED driver is connected to the pins at one end of the lamp (note polarity marking). The pins at the opposite end are not connected and are for mechanical support only. For customers not requiring these, lamps are available with a pinless cap.



Satin Versions

While the clear lamps deliver superior optical control and efficiency due to the tiny diameter internal light source, lamps having a soft-white satin coating are also available. This can be helpful to reduce glare, or to increase the lighted diameter to the same as fluorescent lamps for exact compatibility with existing luminaire optics. For this reason, T8 (26mm diameter) satin lamps are optionally available. The full 360 degree light emission pattern is still maintained.

Mechanical Variants

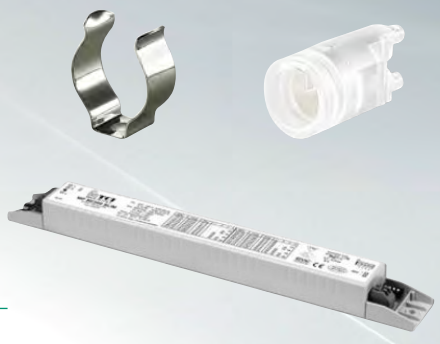
Although IP rated lampholders are available (see next page), in some applications it is more convenient to employ Helios lamps supplied with pre-installed cables. These are available either with flying leads, or terminated with standard IP rated electrical connectors. Various designs of end caps are available which may incorporate structural features for supporting the lamps. Shatterproof external sleevings are also available, including with materials for ultraviolet transmission.

Luminaires

Thanks to the Helios lamps sharing the same dimensions and end caps as linear fluorescent lamps, it is simple to integrate them in luminaires originally developed for fluorescents. It is only necessary to use a conventional DC constant current LED driver, electrically connected to the holder at one end of the lamp. The below photographs are illustrative of standard luminaires which can be adapted to benefit from the impressive performance of Helios lamps.

Accessories

To facilitate stand-alone use of Helios lamps, Sylvania also stocks a limited range of drivers, reflectors, lampholders and support clips. Note that in case of operating multiple lamps on a single driver, the lamps should be connected in series.



Code	Description	Lamps	Driver Currents
9020179	MP 50/350	3	100/117/134/150/167/184/200/217/234
		2	250/267/284/300/317/334/350
		1	
9020180	MP 80/350	3	200/210/220/230/240/250/260/270/280/290/300/310/320/330/340/350
		2	
		1	
9020181	MP 80/700	2	325/350/375/400/425/450/475/500/525/550
		1	575/600/625/650/675/700
9020182	MP120/700	3	325/350/375/400/425/450/475/500/525/550/575
		2	600/625/650/675/700
		1	

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